

CLAIMS

1. A pharmaceutical dosage unit manufacturing process control apparatus, comprising:
 - an image sensor including an array of detector elements located generally along an axis that is perpendicular to a direction of a flow of pharmaceutical dosage units,
 - a spectrally selective element located in an optical path between a radiation source, the flow of pharmaceutical dosage units, and the image sensor, and
 - a spectral processor responsive to an output of the array sensor and having an output port.
2. The apparatus of claim 1 wherein the spectral processor includes a color mapping module operative to map spectral information into a color image including differently colored areas that correspond to different parts of the flow of pharmaceutical dosage units having differing responses to different wavelengths.
3. The apparatus of claim 2 further including an additional processor operative to evaluate the differently colored areas, the additional processor having an input responsive to the mapping module and an output for providing information about the areas.
4. The apparatus of claim 2 wherein the mapping module is operative to shift a plurality of the wavelengths in a similar manner.
5. The apparatus of claim 1 wherein the spectral processor includes a spectral comparison module operative to compare spectral signatures from a library of known spectral signatures with spectral information acquired from the image sensor.
6. The apparatus of claim 5 wherein the spectral comparison module is operative to perform spectral comparisons between the spectral information acquired from the image sensor and spectral signatures for known ingredients in a pharmaceutical composition of the dosage units.

7. The apparatus of claim 5 wherein the processor is operative to receive, identify, and store newly detected spectral signatures reported by the spectral comparison module.

8. The apparatus of claim 5 wherein the library of known spectral signatures includes a plurality of spectral signatures for known defects.

9. The apparatus of claim 8 wherein the processor is operative to receive, identify, and store spectral signatures for newly detected defects reported by the spectral comparison module.

10. The apparatus of claim 1 wherein the spectral processor includes a spectral comparison module operative to compare spectral information received by the image sensor from a reference sample located proximate the flow of pharmaceutical dosage units with spectral information received by the image sensor from the flow of pharmaceutical dosage units.

11. The apparatus of claim 1 wherein the image sensor is a two-dimensional array sensor that further includes detectors located generally along an axis that is parallel to the direction of the flow of pharmaceutical dosage units.

12. The apparatus of claim 11 wherein the spectrally selective element includes a diffraction grating.

13. The apparatus of claim 11 wherein the spectral processor includes a color mapping module operative to map spectral information into a color image including differently colored areas that correspond to different parts of the flow of pharmaceutical dosage units having differing responses to different wavelengths.

14. The apparatus of claim 1 further including an image processor responsive to the output port of the spectral processor and operative to evaluate information from the spectral processor.

15. The apparatus of claim 1 wherein the image sensor is an infrared image sensor.

16. The apparatus of claim 1 wherein the image sensor is a near infrared image sensor.

17. The apparatus of claim 1 further including the radiation source directed at the flow of pharmaceutical dosage units at a position to which the array sensor is responsive.

18. The apparatus of claim 17 wherein the radiation source is an infrared radiation source.

19. The apparatus of claim 1 wherein the flow of pharmaceutical dosage units includes a series of dosage units located in rows generally perpendicular to the direction of the flow of pharmaceutical dosage units and wherein the image sensor includes, for each of the dosage units in a row, a plurality of detectors along the axis that is perpendicular to the direction of the flow of pharmaceutical dosage units.

20. The apparatus of claim 1 wherein the spectral processor is a real-time processor operative to process the images at a rate that is at least equal to a rate at which images are acquired by the image sensor.